REMARKS

Claims 1 and 4-6 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Manabe (JP 10-278501) in view of Vaxelaire et al. (USPN 6,726,291). Applicant traverses the rejection because Manabe and Vaxelaire, taken alone or in combination, fail to disclose or suggest that a spring constant of a rim body portion of a wheel is maintained so that the natural frequency of the wheel is greater than the natural frequency of a pneumatic tire.

Manabe is directed to a a disk wheel. The reference describes a wheel that is divided axially into sections 26-38, with different sections of the wheel having different rim thicknesses. However, as acknowledged by the examiner, Manabe fails to disclose or suggest that the natural frequency of the wheel is greater than the natural frequency of the pneumatic tire. Instead, the examiner relies on Vaxelaire to disclose this feature.

Vaxelaire teaches that a wheel has three natural modes of vibration: a tilting mode D_1 where a disk portion of the wheel vibrates at approximately 270 Hz, a pumping mode D_2 where the disk portion of the wheel vibrates at approximately 670 Hz, and a rim mode J_1 where a rim portion of the wheel vibrates at about 240 Hz. Vaxelaire describes techniques that can be used to alter the frequency of the tilting mode of vibration. For example, Vaxelaire teaches that adjusting radial distance of a curved protuberance relative to the axis of a wheel alters the stiffness of the disk (Vaxelaire, col. 5, lns. 22-24), and that circumferentially localized lumps, as shown in Figs. 91 and 9b improve tilting rigidity (col. 6, lns. 16-18, 41-55).

As shown in Figs. 3(a) and 3(b) of Vaxelaire, the changes to the wheel shape alter the vibration response of a conventional wheel (shown in Fig. 3(a)) by splitting the peak D_1 into two separate peaks. That is, Fig. 3(b) shows that the natural vibration mode D_1 of the disk portion of the wheel is split into two close peaks at frequencies of 290 Hz and 315 Hz, rather than a single peak at 270 Hz as in the conventional tire. However, the other natural modes of vibration are not substantially modified (col. 5, lns. 49-53). The pumping vibration mode D_2 and the rim vibration mode J_1 remain similar in both frequency and amplitude, as shown in Fig. 3(b). Thus, Vaxelaire discloses modifying the vibration mode of the disk portion of the wheel, not the rim portion. For this reason, applicants assert that Vaxelaire also fails to disclose a wheel including a rim body portion having a spring constant maintained such that a natural frequency of the wheel is greater than the natural frequency of the tire, as recited in claim 1 of the present application.

In contrast, the present claims recite that a spring constant of a rim body portion of a tire is maintained. The present specification teaches that a rim body portion is not uniform in thickness. Instead, as shown in Fig. 1 of the present application, a tire rim 21X is divided into three equal sections X1, X2, and X3, each of the equal sections having a different average thickness. Rim thicknesses are selected such that the average rim thickness in a disk side section is thickest, the average rim thickness of the flange side section is thinnest, and the average thickness of the middle section is between that of the disk side section and that of the flange side section. Setting rim thicknesses for the various sections in this way advantageously maintains a spring constant, which ensures that the natural

frequency of the wheel is distinct from the natural frequency of the tire. In this way, the rim portion of the wheel is lightened, while the natural frequency of the rim portion remains higher than that of the tire. Since Manabe and Vaxelaire, taken alone or in combination, fail to disclose such a feature, withdrawal of the rejection is respectfully requested.

Moreover, applicant further traverses the rejection of claims 1 and 4-6 because Manabe and Vaxelaire, whether taken alone or in combination, fail to disclose or suggest that a rim body portion of a wheel is divided into three equal sections.

Manabe teaches that a rim-like section 40 forms a flange section 26, an outside cylindrical section 28, a stepped section 30, a shrunk diameter section 32, a tapered section 34, an inside cylindrical section 36 and a flange 38. Thus, Manabe describes a rim section divided into 7 sections, rather than three, as recited in claim 1 of the present application. Further, Manabe is silent regarding the relative widths of the sections. Accordingly, Manabe fails to disclose dividing the rim body portion axially into three equal portions.

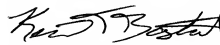
Vaxelaire describes a wheel that includes a rim and a disk. However, Vaxelaire is silent regarding dividing the rim into sections. Accordingly, it follows that the reference also fails to disclose a rim including three equal sections, as recited in claim 1. Accordingly, since Manabe and Vaxelaire, alone or in combination, fail to disclose or suggest that a rim body is divided into three equal sections, as recited in claim 1 of the present application, applicant again requests withdrawal of the rejection of claims 1 and 4-6.

For the foregoing reasons, applicant believes that this case is in condition for allowance, which is respectfully requested. The examiner should call applicant's attorney if an interview would expedite prosecution.

The Commissioner is hereby authorized to charge fees which may be required to this application under 37 C.F.R. §§1.16-1.17, or credit any overpayment, to Deposit Account No. 07-2069.

Respectfully submitted,

GREER, BURNS & CRAIN, LTD.

By 

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